

## **Description of Additional Supplementary Files**

File Name: Supplementary Movie 1

Description: Body axis morphogenesis of a control embryo. Anterior to the left. Consistent posterior body axis narrowing and elongation are visible. Scale bar, 500 $\mu$ m.

File Name: Supplementary Movie 2

Description: Body axis morphogenesis of a SW embryo. Anterior to the left. The embryo is visibly shorter and wider. The starting time of the movie is ~0.5hr after the placing the SW filter. Scale bar, 500 $\mu$ m.

File Name: Supplementary Movie 3

Description: Body axis morphogenesis of a ruptured SW embryo. Anterior to the left. The starting time of the movie is ~0.5hr after the placing the SW filter. Scale bar, 500 $\mu$ m.

File Name: Supplementary Software 1

Description: LabView codes to control the mechanical probe system and corresponding Matlab codes for data analysis.